DIPLOMA – VIEP – ELECTRONICS AND COMMUNICATION ENGINEERING (DECVI) / ADVANCED LEVEL CERTIFICATE COURSE IN ELECTRONICS AND COMMUNICATION ENGINEERING (ACECVI)

Term-End Examination

00859

December, 2017

BIEL-029 : ELECTRONIC MEASUREMENT AND INSTRUMENTS

Time : 2 hours *Maximum Marks : 70*

Note : *Attempt **five** questions in all. Question no. **1** is **compulsory**. All questions carry equal marks. Missing data, if any, may be assumed. Use of scientific calculator is allowed.*

1. Choose the correct answer from the given four alternatives : *7×2=14*

(a) The inductance of the coil using Q-meter can be calculated by the expression

(i) $\frac{1}{2\pi fc}$ Henry

(ii) $\frac{1}{(2\pi f)^2 c}$ Henry

(iii) $2\pi fc$ Henry

(iv) $(2\pi f)^2 c$ Henry

(b) An aquadag is used in CRO to collect

(i) Primary electrons

(ii) Secondary electrons

(iii) Both primary and secondary emission electrons

(iv) None of these

(c) Systematic errors are

(i) Instrumental errors

(ii) Environmental errors

(iii) Observation errors

(iv) All of the above

(d) Operating torques in analogue instruments are

(i) deflecting and control

(ii) deflecting and damping

(iii) deflecting, control and damping

(iv) vibration and balancing

(e) In CRO, which of the following is ***not*** a part of electron gun ?

(i) Cathode

(ii) Grid

(iii) Accelerating anode

(iv) X-Y plates

(f) A PMMC instrument can measure

(i) AC only

(ii) DC only

(iii) Both AC and DC

(iv) None of the above

(g) In spring controlled moving iron instruments, the scale is

(i) uniform

(ii) cramped at the lower end and expanded at the upper end

(iii) expanded at the lower end and cramped at the upper end

(iv) cramped at both, the lower and the upper ends

2. (a) Draw a neat block diagram of an analog multimeter. Also explain the function of each block. 7

(b) Design a multirange ammeter with a range of 0 – 1 A, employing shunt in each. A D'Arsonval movement with an internal resistance of 500 Ω and full scale deflection of 10 mA is available. 7

3. (a) What is the difference between Accuracy and Precision ? 4

(b) What are the main types of errors in instrumentation systems ? What are the sources, effects and ways to reduce or eliminate these errors ? Explain in brief. 10

4. (a) With the help of a block diagram, explain the operation of digital storage oscilloscope. 7

(b) What are Lissajous patterns ? Explain how they can be used for frequency and phase measurement. 7

5. (a) Describe with the help of a neat block diagram, the operation of an AF-type sine wave generator. 7

(b) What is a Spectrum Analyzer ? Draw the block diagram of a basic spectrum analyzer. 7

6. (a) Draw a schematic of a dual slope Digital Voltmeter (DVM) and explain its principle. 7

(b) Explain the operation of a Q-meter with a neat schematic. 7

7. Write short notes on any ***two*** of the following : *2×7=14*

(a) Digital Multimeter

(b) Static and Dynamic Characteristics of Instruments

(c) Cathode Ray Tube (CRT)

(d) Pulse Generator